| | | | | | |
|---|---|---|---|---|---|
| | *Cyclodomorphus branchialis* | 7 | - | - | - |
| | *Hemiergis quadrilineata* | 53 | 100 | 135 | 132 |
| | *Lerista elegans* | 9 | 19 | 12 | 40 |
| | *Lerista lineopunctulata* | 26 | 14 | 22 | 7 |
| | *Lerista praepedita* | - | 3 | 4 | - |
| | *Menetia greyii* | 3 | 2 | 4 | 17 |
| | *Morethia lineoocellata* | - | - | 1 | - |
| | *Morethia obscura* | - | - | 2 | - |
| Bobtail | *Tiliqua rugosa* | 8 | 5 | 4 | 5 |
| Pygopodidae | | | 1 | - | 5 |
| | *Aprasia repens* | 1 | | | |
| | *Lialis burtonis* | 8 | 12 | 16 | 1 |
| | *Pletholax gracilis* | 0 | - | - | - |
| Varanidae | | | - | - | - |
| Gould's Goanna | *Varanus gouldii* | 1 | | | |
| Rosenberg's Goanna | *Varanus rosenbergi* | - | - | 0 | - |
| Typhlopidae | | | | | |
| | *Ramphotyphlops australis* | - | 4 | 2 | 2 |
| *Elapidae* | | | | | |
| Dugite | *Pseudonaja affinis* | 0 | 0 | 0 | 0 |
| Jan's Banded Snake | *Vermicella bertholdi* | 10 | 9 | 23 | 14 |
| Black-naped Snake | *Vermicella bimaculata* | 1 | - | 3 | 1 |
| Black-striped Snake | *Vermicella calonotos* | 1 | 3 | 4 | 3 |
| Narrow-banded Snake | *Vermicella fasciolata* | 2 | - | 2 | - |
| Southern Shovel-nosed Snake | *Vermicella semifasciata* | 5 | - | - | 5 |

# ECOLOGICAL APPRAISAL OF AN ISOLATED BANKSIA WOODLAND RESERVE No. 3694 SOUTH OF THE SWAN RIVER, PERTH.

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## INTRODUCTION

European man has greatly modified the environment of the Swan Coastal Plain. The greatest change has occurred in the last two decades at a time when the destruction of the natural environment is accelerating and there is an increasing awareness of the need for areas of natural bushland to be set aside for conservation.

The dominant vegetation type of the Perth area is *Banksia* woodland. A review of its importance was made in the *Banksia* Woodland Symposium where Hopper and Burbidge (1987) estimate only 7% of the original *Banksia* woodlands of the Swan Coastal Plain are on conservation reserves.

Little is known of which fauna survives on remnants south of the Swan River. Previous published studies (How *et al.* 1979, and How and Dell 1990) have concentrated on sites north of the river.

Few areas were previously set aside in the older established suburbs. Therefore any area of bushland within the inner metropolitan area assumes great value for conservation.

An examination of recent aerial photographs of the South Perth/Victoria Park area reveals very few remnants of natural bushland. One of these, Reserve 3694, ( Figure 1 ) of c. six hectares vested with the City of Perth, is situated in Baron- Hay Court, Victoria Park. It is currently vested for Public Recreation.

In 1990 I undertook a trapping program on this reserve as part of my studies for the degree of Bachelor of Education.

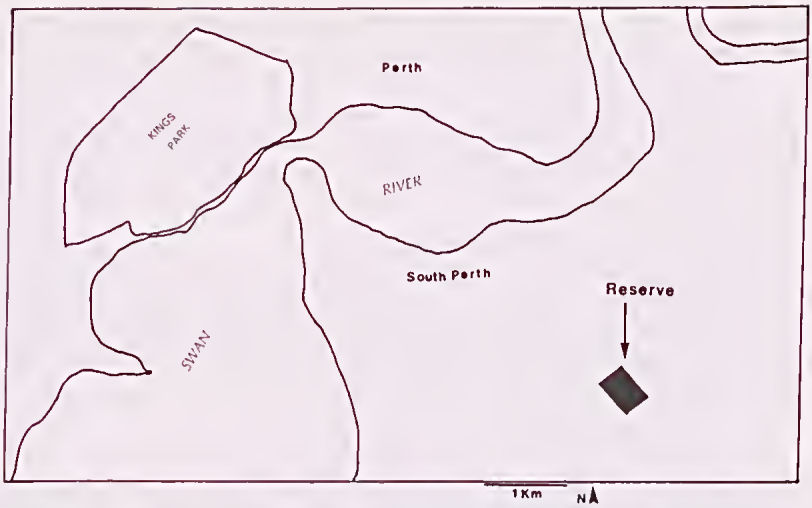


**Figure 1:** Map showing location of Reserve 3694 and location of nearest other conservation site, Kings Park.

## STUDY AREA AND METHODS

Four sample sites were selected to reflect the main vegetation types. Sites 1, 2, and 3 had not been burnt for some years. Site 4 appeared to have had a fire approximately two years previously.

In each site a 30 metre drift fence of 30 cm high flywire was set consisting of six 50 cm deep, 15 cm diameter PVC pit traps were evenly spaced evenly below the fence. This method of pit trapping was outlined by the Biological Surveys Committee (1984).

The traps were operated for three five day sessions — 17 to 22 March, 29 March to 3 April and 14 to 19 April 1990 — for a total of 360 trapnights. They were checked each morning. Captures were identified and the vertebrates were measured and weighed before release at point of capture.

Opportunistic sampling of diurnal reptiles was made by hand, turning over logs, rocks and pieces of tin, and scraping through leaf litter with a garden cultivator. Nocturnal geckos and spiders were located by reflective eyeshine from a head torch. After rain the site was visited at night to record calling frogs.

A list of birds sighted and those calling, as well as larger active insects, were noted each trapping session.

Frogs were identified from Tyler *et al.* (1984), geckos and legless lizards from Storr *et al.* (1990), dragons from Storr *et al.* (1983), skinks from Storr *et al.* (1981) and birds from personal experience and Simpson and Day (1986).

Plants were sampled at the four trapping sites by marking a ten metre by ten metre census quadrat with string. The vegetation was divided into four strata and specimens of each species were taken for identification, mainly by using Bennett (1988) and Smith (1985). Plants of significant numbers or of significant biomass were then counted and recorded.

The soil type of the Reserve is Bassendean Sand. It is leached dunes of quartz sand. Seddon (1972) states that Bassendean Sand coincides with the banksia-sheoak-prickly bark low open forest as a distinctive unit.

The Bassendean Sands are remnants of old coastal dunes formed during the Pleistocene. These dunes have been leached of their calcium carbonate, iron and most other minerals. They are thus chemically and physically infertile (Beard 1979).

This patch of Banksia woodland shows little serious effect of fire in the recent past. Its unique position next to the Victoria Park Fire Station ensures that fires are dealt with almost as soon as they are lit and fire is unlikely to be a problem.

A small patch in the centre had been burnt about two years ago but this fire was so cool that the trunks and canopies of the *Banksia* trees had not been damaged. Most of the low shrubby plants were regenerating from lignotubers. Very few woody species had regenerated from seed. This shows the natural ability of shrubs to cope with fire.

## RESULTS

Fifty-two plant species were recorded including 44 in the census sites. They are listed in Table 1 with an indication of the number counted in each quadrat.

Vertebrates and larger invertebrates caught in the pit traps are listed in Table 2 and discussed briefly below.

*Amphibians*

Only one species, the Banjo Frog, *Limnodynastes dorsalis* was captured. Six were caught after rain on 30 March and two on 3 April. Five were juvenile with SVL 35.5-40 mm and weight 4.0- 5.0 g. The other was an adult, SVL 70 mm weight 40.5 g. and had a tick attached to one of its toes. I am not aware of any previous records of ticks on amphibians.

*Reptiles*

Twelve species of reptiles were positively identified during this study. Another species, the dragon *Tympanocryptis adelaidensis*, was sighted but needs positive identification.

Two nocturnal geckos, the Marbled Gecko *Phyllodactylus marmoratus* and a spotted gecko *Diplodactylus alboguttatus* were recorded in the pit traps. Because of the low autumn night temperatures no geckos were observed when headtorching.

Two legless lizards were recorded. A slender legless lizard *Pletholax gracilis* was caught in the pit traps and Burton's Legless Lizard *Lialis burtonis* was active in the daytime.

The Western Bearded Dragon *Pogona minor* was caught in pit traps on three occasions. Another was seen basking on a Banksia tree.

Skinks were the most numerous group of lizards with seven species and 24 individuals trapped and others sighted. The most abundant species were the two leaf litter inhabitants, *Hemiergis quadrilineata* and *Lerista elegans*.

*Invertebrates*

Wolf spiders and other spiders were abundant and frequently caught in the pit traps in all sites, especially in the second and third trapping sessions.

The millipedes were rarely caught in contrast to centipedes of which two species were caught frequently. A golden species was the most common.

Beetles were the most abundant insects caught, particularly those species which feed on plant material. Other plant eating insects such as crickets and grasshoppers were common.

Large insects, such as cockroaches, which feed on dead plant material, were frequently recorded. Carnivorous insects, including praying mantis and carab beetles were rarely caught.

*Birds*

Seventeen species of birds were recorded (Table 3), the most abundant were the three species of honeyeaters. During the first trapping period they were mostly feeding on the woolly bush *Adenanthos cygnorum*. However once the *Banksia menziesii* began to bloom they moved to the *Banksia* flowers.

The other abundant bird was Carnaby's Cockatoo *Calyptorhynchus latirostris* which was recorded in flocks of up to c. 230 birds. Storr and Johnstone (1988) recorded these as being common on the Swan Coastal Plain, both as visitors and residents but breeding only very sparingly. They are attracted to nearby pine trees but were observed biting the flowers off *Banksia menziesii*.

Three species of diurnal birds of prey were recorded. The Black-shouldered Kite *Elanus caeruleus* was rarely reported before 1942 in the Swan Coastal Plain (Storr & Johnstone 1988) but is becoming moderately common. The Brown Goshawk *Accipiter fasciatus* and the Collared Sparrowhawk *Accipiter cirrocephalus* are considered scarce. The area near the quarry (sandpit) gave these birds a high vantage point over the surrounding area.

One species, the Laughing Dove *Streptopelia senegalensis* is introduced. It was released from South Perth Zoo from 1898 and is common in Perth suburbs.

*Mammals*

Only one species, the introduced Mouse, *Mus musculus*, was recorded.

## DISCUSSION

This reserve of only six hectares has a rich and diverse list of plants including the 52 species recorded in the study quadrats. Many other species undoubtedly occur on the reserve and would be recorded during a more intensive survey in spring when ephemeral species would be recorded.

The twelve species of reptile recorded include two species of considerable conservation interest. The small spotted gecko, *Diplodactylus alboguttatus* is an extension of this species' known range. According to Storr et al. 1990 it had not previously been recorded south of the Swan River and was only known from coastal sites from City Beach northwards. The slender legless lizard *Pletholax gracilis* is rarely recorded south of the Swan River and rarely on conservation reserves.

The other reptiles are within their previously known ranges. However there are few localities within the suburbs south of the Swan River where communities of this many species occur.

As indicated by How and Dell (1990) most native mammals have declined on the Swan Coastal Plain. It is not surprising therefore that a reserve of only six hectares appears to have no native species. Kitchener *et al.* (1978)

found that the mammals of the Swan Coastal Plain originally numbered 33. Fifteen of these are now believed to be locally extinct. Many others , although not extinct are now only found outside of residential areas. Their habitat has been destroyed or altered and introduced predators like the Fox, *Vulpes vulpes* and Domestic Cat, *Felis catus* and increasing frequency of fire are believed to be responsible for the disappearance of many. The study by Kitchener *et al.* found that *Mus musculus* was widely distributed throughout the North Swan Coastal Plain.

Seventeen species of bird were noted during this study. These included three species of diurnal birds of prey which are becoming scarce in urban environments. Another bushland species which does not occur in urban gardens was the Rufous Whistler *Pachycephala rufiventris.*

The Reserve provides food and probably nesting sites for birds which frequent gardens in the surrounding suburbs. The three species of *Banksia* are rich sources of nectar for the honeyeaters which were commonly seen feeding on the flowers.

In winter and spring other birds could be expected to occur as they migrate through the Swan Coastal Plain. Therefore the value of the Reserve to birds is considerably more than this autumn study indicates.

The Reserve has considerable conservation value in maintaining a rich and diverse community of plants and animals most of which have disappeared from urban suburbs south of the Swan River. Management of the Reserve should be planned carefully to prevent any disturbance. Being only six hectares all of the bushland should be retained to enable animals and plants to maintain viable breeding populations.

Two species of reptile, a gecko and legless lizard (see discussion) are of conservation significance in a regional context and are further compelling reasons why the Reserve should be retained as a conservation area.

The Reserve has a different plant community from that of Kings Park, and complements other reserves of the Swan Coastal Plain.

This study revealed that a small patch of bushland in an urban environment can be rich in animal and plant species. Such patches of bushland are of importance in maintaining representatives of natural communities which were once widespread before the land was cleared for housing or industry.

## ACKNOWLEDGEMENTS

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**Table 1:** List of plant species recorded in 10m² census quadrat showing number of individual plants in each vegetation stratum. Species listed as x were recorded in census site but not counted because they were either in low numbers or of insignificant biomass. Species recorded as + were recorded elsewhere in reserve but not occurring in census sites. Species marked with an asterisk are non Australian introduced species.

| | In Reserve but not in census sites | Site 1 | Site 2 | Site 3 | Site 4 |
|---|---|---|---|---|---|
| **Stratum 1** | | | | | |
| *Eucalyptus marginata* | + | | | | |
| *Eucalyptus todtiana* | | | | 2 | |
| *Banksia attenuata* | | 1 | 4 | 4 | 1 |

| | In Reserve but not in census sites | Site 1 | Site 2 | Site 3 | Site 4 |
|---|---|---|---|---|---|
| *Banksia ilicifolia* | + | | | | |
| *Banksia menziesii* | | 4 | 1 | 2 | 1 |
| *Allocasuarina fraseriana* | + | | | | |
| **Stratum 2** | | | 13 | 2 | |
| *Adenanthos cygnorum* | | | | | |
| *Macrozamia riedlei* | + | | | | |
| *Jacksonia sternbergiana* | + | | | | |
| *Jacksonia furcellata* | | | | 5 | |
| **Stratum 3** | | | | | |
| *Stirlingia latifolia* | | 9 | 2 | 5 | 23 |
| *Gompholobium sp.* | | 10 | 1 | 4 | 7 |
| *Allocasuarina humilis* | | 90 | 130 | 20 | 10 |
| *Daviesia divaricata* | | 29 | 1 | 14 | 46 |
| *Petrophile macrostachya* | | | | 6 | |
| *Xanthorrhoea sp.* | + | | | | |
| **Stratum 4** | | | | | |
| *Hibbertia hypericoides* | | 46 | 12 | 18 | 24 |
| *Leucopogon sp.* | | 19 | | 11 | 15 |
| *Mesomelaena pseudostygia* | | 84 | 71 | 56 | 140 |
| *Conostephium preissii* | | 6 | | 2 | 1 |
| *Calectasia cyanea* | | 110 | 18 | x | x |
| *Pattersonia occidentalis* | | 44 | 76 | 33 | 29 |
| *Conostylus setigera* | | x | 1 | x | x |
| *Petrophile linearis* | | x | | x | x |
| *Dasypogon bromeliifolius* | | x | | | x |
| *? Scholtzia* | | x | 7 | 4 | 10 |
| *Stylidium sp.* | | x | x | | |
| *Astroloma pallidum* | | | 1 | | 1 |
| *Dampiera linearis* | | | x | x | x |
| *Acacia stenoptera* | | | x | x | x |
| *Bossiaea eriocarpa* | | | x | | |
| *Eriostemon spicatus* | | | | 13 | |
| *Pimelea suaveolens* | | | 1 | x | |
| *Melaleuca scabra* | | | | 12 | |
| * *Briza maxima* | | | x | x | |
| *Lepidosperma angustatum* | | | x | x | |
| *Burchardia umbellata* | | | x | x | |
| *Neurachne alopecuroidea* | | | | x | |
| *Lomandra preissi* | | | | x | |
| *Calothamnus sanguineus* | | | 4 | | |
| *Scaevola canescens* | | | 3 | | |
| *Lomandra sp.* | | | 1 | | |
| *Corynotheca micrantha* | | | x | | |
| *Neurachne alopecuroidea* | | | x | | |
| * *Gladiolus caryophyllaceus* | | x | x | x | x |
| * *Ehrharta calycina* | | 15 | 82 | 23 | 3 |
| *Calytrix sp.* | + | | | | |
| Family indeterminate (long grey leaves) | x | | | | |
| Family indeterminate (low grass) | | | | x | x |
| Family indeterminate (tall native grass) | | | | x | |
| Family indeterminate (very low grass) | | | x | x | |
| Family indeterminate | | | x | | |

Table 2: List of vertebrates and larger invertebrates caught in pitfall traps. Each trapping site for the three trapping periods is shown together with the total for each species.

| | Site 1 | | | Site 2 | | | Site 3 | | | Site 4 | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Species | 1st | 2nd | 3rd | 1st | 2nd | 3rd | 1st | 2nd | 3rd | 1st | 2nd | 3rd | |
| AMPHIBIANS | | | | | | | | | | | | | |
| Leptodactylidae | | | | | | | | | | | | | |
| *Limnodynastes dorsalis* | | | | | | | | 6 | | | | | 6 |
| REPTILES | | | | | | | | | | | | | |
| Agamidae | | | | | | | | | | | | | |
| *Pogona minor* | | | 1 | | 1 | 1 | | | | | | | 4 |
| Gekkonidae | | | | | | | | | | | | | |
| *Diplodactylus alboguttatus* | 1 | | | | | | | | | | 1 | | 2 |
| *Phyllodactylus marmoratus* | | | | | | | | | | 1 | | | 1 |
| Pygopodidae | | | | | | | | | | | | | 1 |
| *Lialis burtonis* | | | | | | | | | | | | | |
| *Pletholax gracilis* | | | | | | | 1 | | 1 | | | | |
| Scincidae | | | | | | | | | | | | | |
| *Cryptoblepharus placgiocephalus* | | | | | | | | | | | | | |
| *Ctenotus fallens* | | | | 1 | | | 1 | | | 1 | | | 2 |
| *Ctenotus lesueurii* | 1 | | | 1 | | | | | | | | | 2 |
| *Hemiergis quadrilineata* | | 1 | | 1 | | | | | 1 | | 3 | | 6 |
| *Lerista elegans* | | 2 | | 4 | | | 1 | | | 1 | | | 8 |
| *Menetia greyii* | | 1 | 2 | 1 | | | | | | | | | 4 |
| *Tiliqua rugosa* | | 1 | | | | | | | | | | | 1 |
| MAMMALS | | | | | | | | | | | | | |
| *Mus musculus* | | 3 | 2 | 1 | 2 | | 2 | 2 | 2 | 3 | 5 | 1 | 23 |
| ARACHNIDS | | | | | | | | | | | | | |
| Wolf Spiders | | 1 | 2 | | 3 | 2 | 1 | 3 | 1 | | 3 | 8 | 24 |
| Trapdoor Spiders | | | | | | | | | | | | | |
| Other spiders | | | 5 | | 2 | 1 | | 3 | 1 | | | 4 | 16 |
| MYRIOPODA | | | | | | | | | | | | | |
| Centipedes | 1 | | 4 | | | | 1 | | 2 | | 2 | | 10 |
| Millipedes | 1 | | | | | | | 1 | | | | | 2 |
| INSECTA | | | | | | | | | | | | | |
| Beetles Carabs | | | | | 2 | | | | | | | | 2 |
| Tenebrionids | | | | | | 1 | 2 | 3 | | | | 1 | 2 |
| Weevils | | 1 | 1 | | | | | 1 | | | | 1 | 7 |
| Other | | 1 | 2 | | 2 | 1 | | | | | | | 6 |
| Crickets/Grasshoppers | | 1 | | | 1 | 4 | | 1 | | | | | 7 |
| Bees/Ants/Wasps | 1 | | 5 | | | 1 | | | 2 | | 1 | 1 | 11 |
| Earwigs | | | | | | 1 | | | | 1 | | | 2 |
| Cockroaches | | | 1 | 1 | 1 | 1 | 2 | 1 | | | 1 | | 8 |
| Praying Mantis | | | | 1 | | | | | | | | | 1 |

Table 3: Bird species recorded.

| | |
|---|---|
| Black-shouldered Kite | *Elanus caeruleus* |
| Brown Goshawk | *Accipiter fasciatus* |
| Collared Sparrowhawk | *Accipiter cirrocephalus* |
| Laughing Dove | *Streptopelia senegalensis* |
| Ring-necked Parrot | *Platycercus zonarius* |
| Carnaby's Cockatoo | *Calyptorhynchus latirostris* |
| Welcome Swallow | *Hirundo neoxena* |
| Black-faced Cockoo-shrike | *Coracina novaehollandiae* |
| Rufous Whistler | *Pachycephala rufiventris* |
| Willie Wagtail | *Rhipidura leucophrys* |
| Striated Pardalote | *Pardalotus striatus* |
| Grey-breasted Silvereye | *Zosterops lateralis* |
| Brown Honeyeater | *Lichmera indistincta* |
| Singing Honeyeater | *Meliphaga virescens* |
| Red Wattlebird | *Anthochaera carunculata* |
| Australian Magpie | *Cracticus tibicen* |
| Australian Raven | *Corvus coronoides* |